

Remarks

This application has been reviewed in light of the Office Action of May 19, 2003. Claims 1-22 are pending. Claims 18-22 are withdrawn from consideration, and claims 1-17 are rejected. In response, claims 1, 14, and 17 are amended; and the following remarks are submitted. Reconsideration of this application, as amended, is requested.

Restriction Requirement

Applicant affirms the election of claims 1-17, with traverse. The basis of the traverse follows.

First, the restriction is based upon an assertion that the "product could be made by a process wherein the bond coat is deposited with the average grain boundary displacement rather than processing the deposited bond coat to have this displacement." This asserted approach does not distinguish the method of claims 1-17 from the article of claims 18-22. That is, the method of claims 1-17 cover either depositing the bond coat with this displacement limitation or depositing and then processing the bond coat to have this displacement limitation. Specifically, the article of claim 18 may be produced by the method of claim 1 or the method of claim 14 (as well as other recited method approaches).

Second, it is asserted that the article and the method have acquired separate status in the art, based upon different patent office classifications. Patent office art classifications are administrative conveniences developed in the patent office. There has been no showing that they bear any relation to the manner in which those skilled in the art view the art. Hence, there is no support for the assertion that they "have acquired a separate status in the art". If the Examiner intends to rely upon this concept of separate status in the art to support the restriction, Applicant asks that the Examiner set forth the factual basis to demonstrate that those skilled in the art, rather than those who establish the patent office classification system, would view the article and the method as having acquired separate

status.

Third, there is no undue burden placed on the patent office by examining all of the claims of Groups I and II.

The different patent office classifications simply mean that the claims might otherwise be referred to different examining groups--it does not mean that an examiner in either examining group should not perform a search covering both art classifications. To conduct a proper examination of the claims of either Group, the art of both class 427/252 and class 428/469 should be searched to meet the thoroughness requirement of the rules, because these classes/subclasses have now been recognized by the Examiner to include relevant art. The art class dealing with a method may contain a reference that incidentally discusses a final structure that is pertinent to the present invention, and the art class dealing with an article may contain a reference that incidentally discusses a pertinent method. The rules provide:

"On taking up an application for examination or a patent in a reexamination proceeding, the Examiner shall make a thorough study thereof and shall make a thorough investigation of the available prior art relating to the subject matter of the claimed invention. The examination shall be complete with respect both to compliance of the application or patent under reexamination with the applicable statutes and rules and to the patentability of the invention as claimed, as well as with respect to matters of form, unless otherwise indicated. [37 C.F.R. § 1.104(a)].

There has been no showing that a search of these two art classes/subclasses would pose a serious burden on the Examiner, and both should be searched. Multiple art classes/subclasses are routinely searched when applications are examined, and there is no reason that all of the art classes/subclasses identified by the Examiner as relevant cannot be searched in this case. MPEP 803 states:

"If the search and examination of the entire application can be made without serious burden, the Examiner must examine it on the merits, even though it includes claims to distinct or independent inventions." [Emphasis added]

Given that 37 C.F.R. § 1.104(a) mandates a thorough examination, which would presumably include searching in both art classes, the mandate of MPEP 803 requires that both inventions be examined. If the restriction is maintained, Applicant asks that the Examiner demonstrate why a search of both classes/subclasses would pose a serious burden, and in fact why both classes/subclasses should not be searched to meet the thoroughness requirement. Applicant wants a thorough search of its invention, and is concerned that the search may be less than thorough if certain search classes are arbitrarily excluded for restriction reasons.

Fourth, the restriction is made pursuant to 35 U.S.C. § 121. The claims must be shown to be "independent and distinct" to maintain the restriction, 35 U.S.C. § 121, 37 C.F.R. § 1.141, MPEP 802. Since this requirement is statutory, it is not proper to interpret the statute in any other fashion. 35 U.S.C. § 121 provides no basis for restriction on the ground that the patent office has classified the inventions of the various claims into different art classifications and search fields. In this case, the claims are neither independent nor distinct.

The restriction asserts that the inventions are "distinct", but does not address the question of whether the inventions of Groups I and II are "independent", as required by the statute, the regulation, and the MPEP.

Applicant submits that the inventions of Groups I and II are not "independent". The term "independent" is defined in MPEP 802.01:

"The term 'independent' (i.e., not dependent) means that there is no disclosed relationship between the two or more subjects disclosed, that is, they are

unconnected in design, operation, or effect..."

The restriction can be made only "If it can be shown that the two or more inventions are in fact independent...", MPEP 806.04.

As made quite clear in the specification, the subject matter of Groups I and II are not "independent". Specifically, the disclosed relationship is that of an article and a method for fabricating the article.

The inventions are also not distinct. MPEP 806.05(f) provides that the inventions are distinct if " ... the process as claimed can be used to make other and different products." (emphasis in MPEP) The present argument of distinctness relies on this provision of the MPEP. For the reasons stated above in relation to point (1), the two hypothetical articles that are said to be producible by the present method do not support the restriction.

For these reasons, the claims are not "independent and distinct". They are neither, and therefore should be examined in the same application, pursuant to the various statutes, regulations, and MPEP sections set forth herein. Applicant asks that the Examiner reconsider and withdraw the restriction requirement as to Groups I and II.

Examination on the Merits

Before addressing the individual grounds of rejection involving assertions of obviousness, Applicant will discuss the matter of the numerical limitation "yttria-stabilized zirconia having a yttria content of from about 3 percent by weight to about 5 percent by weight of the yttria-stabilized zirconia" (quoted from claim 1, but claims 17 and 18 have a similar recitation).

The law provides that patentability may be found even when there are overlapping ranges. A key feature of the present invention is the discovery that a specific narrow range of yttria content in yttria-stabilized zirconia (YSZ) produces surprisingly and unexpectedly

improved results, as compared with the broader range typically taught in the art. As stated at paragraph [0034] of the Specification, "In the past, it has been known to use YSZ with from about 2 to about 12 weight percent of yttrium oxide. The prevailing industrial practice is to use YSZ with about 7 weight percent yttrium oxide (termed 7YSZ herein)." At paragraph [0035], Applicant explained why the 3-5YSZ produces better results than other compositions of YSZ, and discussed how the upper and lower limit on the yttria content were determined. At paragraph [0036], Applicant presented experimental results of 4YSZ compared with the conventional industrial composition of 7YSZ to establish that the use of 4YSZ leads to better performance of the tested articles.

The law recognizes that, where the prior art discloses extremely broad "laundry-list" ranges, the discovery of a specific narrower range, having improved properties not suggested or taught by the reference, within the broad range may lead to patentability. That is, a showing of surprising and unexpected results in a claimed subrange overcomes the prima facie showing of the overlapping ranges. It is well established that if the proportions are critical to the properties of the product, the recitation of the proportions can render the product patentable over the broader range of the art. See, for example, Becket v. Coe, 98F2d 332 (CAFC 1938); In re Becket, 33 USPQ 334 (CCPA 1937); In re Arness, 37 USPQ 217 (CCPA 1938). Where there is criticality of the proportions, the recited proportions can lead to patentability. See Ex parte Selby, 153 USPQ 476 (Bd.Appels 1966); In re Waymouth, 182 USPQ 290 (CCPA 1974). In the present case, the criticality of the numerical limitations is disclosed in the specification, proved by experimental results, and recited in the claims, countering any prima facie showing of obviousness based upon the overlap of ranges.

MPEP §2144.05 also recognizes that a claimed invention can be patentable, even though it may overlap a broad range found in the prior art . It provides:

Applicants can rebut a prima facie case of obviousness based on overlapping ranges by showing the criticality of the claimed range. "The law is replete with cases in which the difference between the claimed

invention and the prior art is some range or other variable within the claims. In such a situation, the applicant must show that the particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range." In re Woodruff, 919 F.2d 1575, 16 USPQ2d 1934 (Fed. Cir. 1990). See MPEP Section 716.02 - Section 716.02(g) for a discussion of criticality and unexpected results.

Applicant turns to the specific grounds of rejection.

Claims 1-5 and 9-17 are provisionally rejected under the doctrine of obviousness-type double patenting over SN 09/944,711 in view of Burns U.S. Patent 6,042,898.

Claims 1-17 are provisionally rejected under the doctrine of obviousness-type double patenting over SN 09/944,706 in view of Burns U.S. Patent 6,042,898.

Claims 1-17 are provisionally rejected under the doctrine of obviousness-type double patenting over SN 09/944,705 in view of Burns U.S. Patent 6,042,898.

Claims 1-8 and 12-17 are rejected under the doctrine of obviousness-type double patenting over U.S. Patent 6,340,500 in view of Burns U.S. Patent 6,042,898.

Claims 1-5 and 9-17 are rejected under the doctrine of obviousness-type double patenting over U.S. Patent 6,482,469 in view of Burns U.S. Patent 6,042,898.

Applicant traverses the non-provisional rejections (the last two rejections of the group), and provides the following discussion underlying the traverse. This discussion will also be presented in regard to the provisional rejections (the first three rejections of the group), in the event that they become non-provisional.

Every one of these provisional and non-provisional double patenting rejections relies on Burns: "...because Burns discloses use of YSZ TBC with the claimed yttria concentrations to be conventional TBC layers (col. 4, lines 54-60), use of the claimed

TBC's would have been obvious. In fact, what Burns teaches at this location is:

“Preferably, the columnar ceramic layer 10 will comprise a mixture of zirconium oxide and about 3 wt. % to about 25 wt. % yttrium oxide. Most preferably, the columnar ceramic layer 10 will comprise about 6 wt. % to about 8 wt. % yttrium oxide or about 11 wt. % to about 13 wt. % yttrium oxide, depending on the intended temperature range.” [emphases added]

Burns teaches a broad range of 3-25 percent yttria, with preferred subranges of 6-8 and 11-13 percent yttria. The preferred subranges teach away from the present approach, and exemplify the conventional thinking of the art. The present claims all recite “a yttria content of from about 3 percent by weight to about 5 percent by weight of the yttria-stabilized zirconia”. Applicant demonstrated experimentally that a composition 4YSZ within the recited subrange produces improved results over the closest preferred subrange of Burns, using 7YSZ as the comparative composition. This showing overcomes the prima facie showing of the explanation of the rejection.

Thus, the showing of surprising and unexpected results and criticality overcomes the prima facie rejection.

Applicant asks that the Examiner reconsider and withdraw these rejections and provisional rejections. If the rejections and provisional rejections are not withdrawn, Applicant asks for a thorough explanation.

Claims 1-5, 9-15, and 17 are rejected under 35 U.S.C. § 103 over Spitsberg U.S. Patent 6,482,469. Applicant traverses this ground of rejection.

Applicant has now claimed priority to the application, which became this patent, and therefore Spitsberg '469 is no longer prior art.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

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Claims 1-7, 13, 15, and 17 are rejected under 35 U.S.C. § 102 as anticipated by Burns U.S. Patent 6,042,898. Applicant traverses this ground of rejection.

Claim 1 is amended to incorporate the limitations of claim 14, which is not rejected on this ground, and claim 14 is amended to further limit claim 1. Claims 1-7, 13, 14 and 15 are therefore believed allowable over this ground of rejection. While Burns teaches peening as an optional step to close porosity, Burns does not disclose or suggest any limitation regarding an average grain boundary displacement height as claimed by claim 1. Burns may or may not alter grain boundary displacement. Even if Burns does somehow alter the grain boundary region, Burns provides no guidance as to what an appropriate grain boundary displacement height should be, as the Burns reference is completely devoid of any teaching regarding grain boundary displacement.

Claim 17 is amended with a similar recitation and is believed allowable for the same reason.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claim 16 is rejected under 35 U.S.C. § 103 over Spitsberg U.S. patent 6,482,469. Applicant traverses this ground of rejection.

Applicant has now claimed priority to the application, which became this patent, and therefore Spitsberg '469 is no longer prior art.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claims 1-8 and 13-17 are rejected under 35 U.S.C. § 103 over Spitsberg U.S. Patent 6,340,500 in view of Burns. Applicant traverses this ground of rejection.

Applicant has now claimed priority to the application, which became this patent, and therefore Spitsberg '500 is no longer prior art.

Burns, as discussed earlier, does not teach the limitation "yttria-stabilized zirconia having a yttria content of from about 3 percent by weight to about 5 percent by weight of the yttria-stabilized zirconia" recited in the claims. The prima facie basis of rejection produced by the overlap in the ranges taught by Burns and recited in the claims is overcome by the showing of surprising and unexpected results and criticality.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claims 8, 12, 14, and 16 are rejected under 35 U.S.C. § 103 over Burns. Applicant traverses this ground of rejection.

Burns, as discussed earlier, does not teach the limitation "yttria-stabilized zirconia having a yttria content of from about 3 percent by weight to about 5 percent by weight of the yttria-stabilized zirconia" recited in the claims. The prima facie basis of rejection produced by the overlap in the ranges taught by Burns and recited in the claims is overcome by the showing of surprising and unexpected results.

Burns also does not teach the limitations of the individual claims 8, 12, 14 and 16. In Burns, peening is an optional step and is not even recited as a step in the claims. Regarding claim 8, the assertion in the explanation of the rejection as to the intensity of the peening is not correct, as Burns peens for a different purpose than does the present invention. Burns may optimize peening for its purpose according to its result effective parameters, but that is unrelated to achieve flattening of the surface. Regarding claim 12, Burns does not teach depositing the bond coat and concurrently processing the bond coat. Regarding claim 14 and 16, Burns does not teach the numerical limitations recited in these claims as Burns, following the teachings of the prior art, does not recognize the surprising improvements in performance based on the lower yttria content. Nor does Burns teach or suggest the combination of lower yttria content and controlling the average grain boundary height, which combination is claimed and provides the unexpected improvements in performance. The prima facie rejection of claim 16 also is overcome by the showing of

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surprising and unexpected results as discussed earlier.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

Claims 1-17 are rejected under 35 U.S.C. § 103 over Warnes U.S. Patent 6,472,018 in view of Burns. Applicant traverses this ground of rejection.

Each claim recites in part:

“an average grain boundary displacement height of less than about 3 micrometers”

Neither reference has any such teaching.

Each claim further recites in part:

“a yttria content of from about 3 percent by weight to about 5 percent by weight of the yttria-stabilized zirconia”

Neither reference has any such teaching. Applicant incorporates the prior discussion relating to the showing of surprising and unexpected results and criticality in relation to this limitation.

In the first three lines of page 11 of the Office Action, there is a statement that because Burns teaches closing of porosity, the reduction of grain boundary ridges and specific recited limitations would have been obvious. These are different objectives, and there is no reason to believe that Burns contemplated reducing the height of grain boundary ridges, as is taught by Warnes. Nothing may be inferred from the treatment used by Burns to achieve his objectives about the desirability of reducing grain boundary ridges or of the procedure used to reduce grain boundary ridges. Consequently, the arguments following this statement regarding claims 8 and 14 do not follow.

Applicant asks that the Examiner reconsider and withdraw this ground of rejection.

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Applicant submits that the application is now in condition for allowance, and requests such allowance.

Respectfully submitted,
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